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2014 Bycatch Reduction Engineering Program Grant Awards by Region

Alaska

Project Title: Using combined video, acoustic, and accelerometer measurements to determine the conceptual viability of a “smart” hook for reducing bycatch of shark, turtle, skates, and marine mammals in pelagic and demersal longline fisheries

Applicant: [The Regents of the University of California, San Diego](#)

Description: Ten “TadPro” acoustic/video recorders will be expanded to incorporate accelerometer data logging, for mounting onto the mainline of a longline haul. Fishermen partners will deploy these instruments off the Alaskan coast on 15 sets of longline gear. The demonstration species addressed in this work will be target species like sablefish, grenadier, and halibut; various kinds of bycatch species like rockfish and potentially sharks and skates; and (opportunistically) sperm whale depredation. Longline interactions by all these species will be confirmed by video, and temporal features of both acoustic and accelerometer measurements will be made to determine whether a combination of acoustic/accelerometer measurements can be used to flag whether a particular species is present on a given hook, and whether multiple hooks could be monitored by a single sensor package.

Greater Atlantic

Project Title: Bycatch Avoidance Communication Network Expansion

Applicant: [Cornell University Cooperative Extension Marine Program](#)

Description: With funding from BREP in 2013, Cornell Cooperative Extension (CCE) has successfully developed and is currently managing a collaborative, multi-institutional and industry-based bycatch avoidance network to reduce river herring (blueback and alewives), shad (American and hickory) and butterfish bycatch in the longfin squid fishery. The bycatch avoidance network provides the longfin squid fleet with a system to collect, report, and receive information at sea and allows for real-time avoidance of butterfish and shad/river herring bycatch. Fishermen in the network are reporting real-time observations of bycatch “hot spots” from vessels engaged in the longfin squid fishery to enable the fleet to operate outside of these “hot spot” locations and reduce fleet-wide capture of shad/river herring and butterfish. CCE will continue to increase the number of fleet participants to track “hot spots” year round in the inshore and offshore squid fisheries. The existing butterfish/river herring avoidance network has flat-lined butterfish bycatch thus preventing a closure of the squid fishery, while the directed butterfish fishery has reached their allowable catch. Butterfish bycatch was reduced by 80 percent in 2013 compared to 2012. CCE will also augment the current butterfish and river herring avoidance network to include yellowtail flounder on Georges Bank in the directed whiting/squid fishery since the Georges Bank yellowtail flounder stock is currently considered overfished with overfishing occurring and yellowtail flounder accountability measures are being implemented in the Georges Bank whiting/squid fisheries.



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Project Title: Avoiding bycatch and entanglement of turtles and whales with innovative sub-tidal and offshore aquaculture gear

Applicant: [Marine Biological Laboratory](#)

Description: This project will identify and evaluate promising gear modifications aimed at reducing protected species entanglement risks through a combination of fieldwork involving experimental gear and protected species surrogates and through computer-based engineering simulation techniques. The project team will consult with industry and entanglement experts on the known risks and presumed risks associated with the types of gear used by shellfish farmers; design and fabricate innovative gear modifications aimed at reducing identified risks; evaluate the efficacy of the gear modifications at reducing entanglement risk through the use of biomimicry and field-testing; develop computer simulation techniques to generalize the results of field tests and build a low-cost method of preliminary risk assessments; and disseminate project results through workshops, a project web page, and extension bulletins with the intent of fostering safe and sustainable growth in shellfish aquaculture.

Project Title: Avoiding overfished flounders with Innovative semi-pelagic trawling on Georges Bank

Applicant: [University of Massachusetts, Dartmouth](#)

Description: This proposed project will design and test a low seabed impact semi-pelagic trawling technology for the Northeast groundfish fishery to significantly reduce the catch of overfished yellowtail, winter, and windowpane flounders on Georges Bank. The reduction in the catch of these “choke” species will allow full utilization of healthier stocks such as Georges Bank haddock, pollock, redfish, and hake in the northeast. The design includes the use of semi-pelagic trawl doors and floating synthetic ground cables that are off bottom, but with the trawl on the bottom. The design will reduce seabed contact of groundfish trawls by 2/3 to 3/4. The technology is feasible as it is being used in the North Pacific for Alaska pollock and being tested in Norway for Atlantic cod. The project is a collaboration among a university gear technologist, a state biologist, a gear manufacturer, and a trawler captain. The gear will be tested in fishing year 2015, and will be timely for semi-commercial use for fishing year 2016 when the strong year class of haddock and low flounder annual catch limit on Georges Bank are predicted.

Project Title: Reducing the bycatch of sublegal Jonah crabs in the lobster fishery

Applicant: [University of Rhode Island](#)

Description: This collaborative research project with industry, academia, and managers is to design effective lobster/crab gear that reduces bycatch of sublegal Jonah crabs in the lobster fishery. Lab work to develop escape vent size will be conducted first, followed by field testing on fishing vessels. Four vessels (2 inshore Area 2 and 2 offshore Area 3) will participate in this study with each vessel distributing three sets of project traps on ten trawls in a random manner totaling 30 traps for each vessel. These project traps will include: ten ventless; ten with 2 x 3.5 inch vent (for inshore); ten with 2 1/16 x 3.5 inches (for offshore); and ten with the regulated vent. At a minimum, traps will be hauled bimonthly and the catch documented for one year (minimum of 2880 trap hauls). Fishermen will enter catch data (lobster length, crab width, sex, vent type) into tablets (that will auto record latitude and longitude) that will utilize an existing app (a program called Magpi)



for data tabulation and analysis. Selection curves will be generated for the modified vents for lobster and Jonah crab using the SELECT protocol.

Pacific Islands

Project Title: False killer whales and long-line fishery interactions: Assessing movements of satellite-tagged individuals in relation to longline fishing activity and facilitating studies of interactions with gear

Applicant: [Cascadia Research Collective](#)

Description: Analyses of movements of satellite-tagged false killer whales in relation to longline fishing effort from logbook and observer data will be undertaken using both existing satellite tag data and data obtained through a dedicated field effort to be undertaken offshore of Hawaii Island. Field efforts will concentrate in deep-waters where pelagic false killer whales are most likely to be encountered. Multiple satellite tags will be deployed on each group encountered to track movements and examine spatial spread of groups; above and below-water photographs will be obtained to examine fisheries-related scarring to assess the likelihood of previous fishery interactions by the group; and biopsy samples will be obtained and archived for a study of reproductive and stress hormone chemistry. Results will be disseminated to the fishing community through the false killer whale Take Reduction Team and to a variety of audiences through education and outreach efforts.

Southeast and Caribbean

Project Title: Bycatch reduction with lessened bottom impact through the Wing Trawling System; comparison to otter trawl doors

Applicant: Environmental Trawling Solutions, Inc.

Description: This will be a study of bycatch reduction through new technology of the Wing Trawling System. The Wing Trawling System eliminates the use of the otter trawl door and disperses bycatch prior to entering the capture zone of a trawl. It removes the “herding” effect trawl doors create on bycatch. The Wing Trawling System directs fish away from the center of the trawl while otter doors direct bycatch toward the center of the trawl. In private studies, bycatch reduction with the Wing Trawling System has been very high. Where the top of a trawl cannot be lowered in the center using otter trawl doors, the Wing Trawling System net can be lowered. This lowering of the center of the net reduces capture of undesired bycatch in the trawl. We estimate this reduction to be about 50 percent. We have observed reduced mortality of non-targeted species while operating the Wing Trawling System. Nature interactions are reduced by 90 percent by the elimination of the otter trawl door. A pair of otter trawl doors can scar thousands of square feet of ocean bottom per day. The impact is greatly reduced with the Wing Trawling System. The scarring effect by the otter trawl door also produces mortality to bycatch with the heavy impact of the trawl door to the ocean floor. The Wing Trawling System flies 18 inches above the ocean floor dispersing bycatch to the outside of the capture zone while making very minimal contact with the ocean floor. Invertebrates are destroyed by the otter trawl door, whereas the Wing Trawling System “flies” over the invertebrates.



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Project Title: Performance of a long lasting shark repellent bait for bycatch reduction during commercial pelagic longline fishing

Applicant: [Florida Keys Community College](#)

Description: Previous NOAA funded research has shown substantial reductions in shark bycatch during commercial pelagic longline (PLL) fishing in the Straits of Florida using a bait infused with a time-released chemical shark repellent (SuperPolyShark or SPS; SharkDefense Technologies, LLC) identified from the rotting carcass of dead sharks. However, the efficacy the SPS repellent appears to fade after about 8 hours and PLL gear often soaks for much longer durations. In addition, the insertion of the SPS repellent into the bait during normal fishing operations creates insurmountable logistical challenges for an individual researcher and is highly problematic. This project will work to improve the current SPS time release effectiveness and create a third-generation SPS (v3) repellent and explore the possibilities of inserting the SPS repellent into the bait during pre-processing at the bait processing facility, thereby creating a shark repellent bait that can be purchased by commercial fishers.

Project Title: Increasing compliance and effective enforcement of turtle excluder devices and bycatch reduction devices in the Southeast shrimp fishery – A NOAA Fisheries/Industry Workshop

Applicant: [Gulf and South Atlantic Fisheries Foundation](#)

Description: Over the years, several issues have surfaced which have hampered effective and efficient enforcement of TED regulations. This project will bring together personnel from NOAA Fisheries, industry, and fisheries enforcement agencies to discuss problems associated with TED enforcement. The Foundation will organize and convene a 2-day workshop in early 2015. As a result of this effort, it is expected that all participants will have a clearer understanding of the dilemmas currently being experienced by both industry and various agencies involved with enforcement of TED regulations. It is anticipated that some definitive and productive solutions to current enforcement issues will be generated from interaction among the participants.

Project Title: Techniques for minimizing discard mortality of Gulf of Mexico red snapper and validating survival with acoustic telemetry

Applicant: [Texas A&M University](#)

Description: Mortality associated with regulatory discards is a major impediment to the recovery of the Gulf of Mexico red snapper fishery. The primary goal of this study is to determine if rapid recompression using forced descent or venting can effectively reduce barotrauma and increase year-round survival of red snapper in the Gulf of Mexico under "real-world" fishing conditions. This project will provide essential information about the effectiveness of various methods of releasing fish. These data can be used to more accurately represent discard mortality estimates used in current management models, potentially provide "release credits," by providing key information concerning discard mortality that are sorely needed in the management process to improve recovery of key fisheries.

Project Title: Pilot project to test prototype devices to reduce leader line length on pelagic longline bycatch

Applicant: Vast Array Corporation

Description: The objectives for the project are to work with pelagic longline fishermen in collecting and analyzing data on the practicality, usability, and efficacy of prototype leader line cutting devices developed by the Harvesting Systems Unit ("the HSU") of the NOAA Fisheries Service Southeast Fisheries Science Center. During the project, we will acquire the necessary equipment and materials, develop an appropriate research protocol, work with HSU staff to train vessel operators on the use of the prototype devices and collection of



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survey and video data, assemble and analyze the data, and provide performance summaries and potentially, refinement recommendations to the HSU.

West Coast

Project Title: Exploring off-bottom trawling and other approaches to avoid interactions with structure-forming invertebrates during Pacific Ocean perch fishing on the Bering Sea slope

Applicant: FishNext Research

Description: This project will demonstrate technologies to routinely measure the clearance between rockfish fishing gear and the seafloor. An acoustic altimeter will be designed to allow continuous, frequent, unattended monitoring of clearance between the footrope and/or fishing line of rockfish trawls and the seafloor during routine rockfish trawling. This device will be mounted on the trawl's footrope throughout the study to measure clearance and confirm effectiveness. A footrope camera system will be deployed to observe footrope, rockfish, and seafloor (including structure-forming invertebrates (SFI)) during a two-week trip aboard a Bering Sea trawler in the Pacific Ocean perch fishery, using separate trawls designed to be fished on-bottom and off-bottom. Camera imagery and headrope-mounted sonar will show both rockfish and SFI near the footrope and the proportion of rockfish above that area. This information will be analyzed to compare possible gear designs, trawl clearances and rockfish fishing locations to minimize SFI interactions.

Project Title: Testing the use of traditional fishing knowledge of the Makah Tribe to reduce bycatch in recreational halibut fisheries

Applicant: [Makah Tribe](#)

Description: This project will determine if using čibu·d will reduce bycatch relative to circle hooks in recreational halibut fishing and still maintain similar halibut catch. The team will recreationally fish čibu·d and circle hooks from a charter vessel and compare catch of non-target species (specifically rockfish) and halibut between hook types. At least 26 replicates of 10 fishing line deployments (5 with each hook type) will be conducted to achieve 80 percent power to detect a moderate effect size.

Project Title: Continued research on the use of artificial illumination to enhance Chinook salmon escapement out a bycatch reduction device in a Pacific hake midwater trawl

Applicant: [Pacific States Marine Fisheries Commission](#)

Description: This project looks to continue examining the use of artificial illumination as a technique to enhance Chinook salmon escapement out a bycatch reduction device (BRD). In 2013, with support from FY2012 BREP funding, the Pacific States Marine Fisheries Commission (PSMFC) evaluated if artificial illumination could enhance Chinook salmon escapement by attracting individuals towards escape areas of a BRD. Although a small sample size was examined, the study demonstrated the ability to attract salmon towards and out specific escape windows of the BRD using artificial illumination. The PSMFC will conduct a second year of research with the objective of collecting further data to strengthen 2013 results indicating that illumination can enhance Chinook salmon escapement out a BRD in a Pacific hake midwater trawl.



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Project Title: Examining the effectiveness of T90 codends to reduce bycatch in a multispecies bottom trawl fishery

Applicant: [Pacific States Marine Fisheries Commission](#)

Description: The objective of this study is to build on recent findings and examine the selectivity of a 5.0 inch T90 codend and evaluate its efficacy at reducing discards of overfished rockfishes, sablefish, and immature fishes in the U.S. West Coast groundfish bottom trawl fishery. The codends tested will be 4.5 inch and 5.0 inch T90, and 4.5 inch diamond mesh. A randomized block design will be used to determine the order in which each codend is tested. Codend selectivity will be directly measured using the covered codend method. Percent retention and codend selectivity parameters will be estimated using GLMM and SELECT models. This research will occur over 14 days of fishing aboard a chartered fishing vessel.

Project Title: EcoCatch: Real-time fisheries management for ecological and economic sustainability

Applicant: [Stanford University](#); [University of California, Santa Cruz](#); [The Nature Conservancy](#); [Marine Conservation Initiative](#); [San Diego State University](#)

Description: To aid managers and fishermen in balancing ecological and economic objectives of the California drift gillnet fishery, this project will create a series of predictive catch and bycatch probability models of target and non-target (bycatch) and serve them back to managers and fishermen via eCatch with EcoCast. Models will be developed using a combination of satellite tracking, observer and remotely-sensed data, and habitat modeling techniques. The eCatch with EcoCast smartphone and web-based application will be an extension of the existing eCatch app but with the ability to collect new data and serve predictive models back to managers and fishermen. The end project will be a flexible modeling and application framework for reducing bycatch, applicable to other highly migratory species fisheries.

Project Title: Changing fishing practices through outreach to decrease post-release mortality of protected species in the central California recreational rockfish (*Sebastes* spp.) fishery

Applicant: University of California, Santa Cruz

Description: The objective of this project is to reduce the bycatch mortality of overfished rockfish in the central California recreational fishery by changing fishing practices and attitudes through an outreach training program to increase the number of anglers releasing overfished species back at depth of capture with descending devices. Through this project, two workshops with CPFV captains encompassing the 2015 recreational rockfish season will be conducted to discuss and document the use of descending devices in the fishery. Educational materials and descending devices will be distributed to anglers; free educational catch-and-release charters for anglers to quantitatively test efficiency of devices in 7 central California ports will be offered; and a comparative regional analysis of the outreach program to southern California will be provided. The project will work with CPFV operators to provide baseline data to fishery managers on use, efficiency and attitudes toward using descending devices.



Atlantic Highly Migratory Species

Project Title: Reducing post-release mortality from commercial fisheries bycatch in large coastal sharks

Applicant: [MOTE Marine Laboratory](#)

Description: The proposed work is a continuation of a BREP-funded project that is proving highly successful and efficient in documenting the post-release mortality of large coastal sharks. The new technology (accelerometer/VHF tag package) that has been developed for this work not only provides more detailed and definitive information on animal outcomes, but can do so for 1/6th of the cost of conventional (satellite) tags. Removing the limitation of high tag costs allows for obtaining higher sample sizes than past studies, and provides the opportunity to draw significant correlations between blood stress parameters and animal outcomes.